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THIS IS UNEVALUATED INFORMATION

1. After the one-dimensional sample of an analog computing machine¹ for the solution of Fourier syntheses was completed in the Working Group for Crystal Structure Analysis in the Academy Institute for Medicine and Biology in Berlin-Buch, preparatory work on the two-dimensional version was started. The following is the text of a directive concerning the two-dimensional machine which will serve as a guide for its construction:

The machine will consist of the following construction elements (Baugruppen):

- a. Computing Element (Rechenelement)
- b. Computing gear (Rechengetriebe)
- c. Service device (Bedienungsgeraet)
- d. Amplifier (Verstaerker)
- e. Equipotential divider (Aequipotentialteiler)
- f. Observation device (Sichtgeraet).

(a) The Computing Element is a sinus generator. Its main part is a ceramic plate on which colloidal carbon is sprayed. The plate is provided with contacts in such a way that a square-shaped or rectangularly-shaped surface is available for operation. A sinus function is generated through circular scanning of the coal surface of this plate. The coal plates have already been successfully tested in the one-dimensional Fourier synthesis machine which was developed as a preliminary stage for the big two-dimensional version. Results of the tests made it clear that the same type of sinus generator can be used for the two-dimensional machine. Adjustment of the phases is carried out through rotation of the phase relative to the normal position of the driving axis by means of a motor and a planet gear. Each element is provided with an indicator so that it will be possible to control the adjustment of phases during the operation and to change it. The individual elements are connected with the Service Device through a selector (Ziffernwahleinrichtung) for the setting of phase and amplitude values. The following is the required accuracy of the plates:

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(b) The Computing gear has to be complete with driving motors and control installation for the exact regulation of the rotations. The rotation of the stators has to be kept exactly constant through synchro-motors; the rotation of the rotors also has to be kept exactly constant. The gear will consist of four individual plates (Platinen), namely, three plates with twenty times ten elements² and one plate with twenty times eleven elements. Thus, there will be 840 elements² with stators carrying out 1 to 20 revolutions per minute and motors carrying out 60 to 1,200 revolutions per minute. The gear bloc will be connected by cable only with the Service device and the Current supply. The gears of all stators will be driven by a central motor with exactly constant revolutions. ~~Because of the big size~~ of the entire gear installation, the rotor parts of the elements will be driven by several motors distributed on shafts with a high number of revolutions.

(c) The Service device consists of:

- 1) the central instrument for the adjustment of amplitudes, which is planned as a projecting instrument with a large scale. Graduation mark: 0.25; scale: 100 parts, changeable to 200 parts;
- 2) the central instrument for the adjustment of phases. Planned as a DC rotary field system for projection. Scale: 360 degrees; accuracy: 0.25 degrees;
- 3) a selecting installation with a scanning table (Zifferntast-tableau). 22 line motor selectors with 12 channels at 50 contacts each are planned. Also one group selector with 12 channels at 30 contacts each;
- 4) a potentiometer plate with 840 potentiometers for the adjustment of amplitudes;
- 5) a control desk with an installation for the control and adjustment of the revolutions of the motors driving the rotors;
- 6) a current supply installation consisting of 41 transformers each with 22 separated secondary windings and 840 Graetz rectifiers with a filter chain for the voltage supply of the individual elements.

(d) The amplifier is a cathode amplifier for the modulation of the equipotential divider loop. Electronic voltage stabilization. The required linear deviation is 2 percent.

(e) The equipotential divider consists of 40 individual cadmium sulfide crystals which are on a plexi-glass sheet and which are excited through the light band of an oscillograph loop. All crystals are in parallel connection.

(f) The Observation device consists of two large-type projection tubes⁴ (trochotrons) which can be operated successively and which are provided with optics and photographic installations. 16 millimeter camera. An 18 kV high-voltage instrument will supply the anode voltage for the projection tubes.

2. Before actual work on the big two-dimensional machine will start, a small two-dimensional model with 25 elements will be built. Work on this model is to start in June 1954.

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2/ Comment. 840 seems to be the correct number of elements, although the indications given above seem to refer to 820 elements only.

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